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Tuberculosis in Thames Valley: Annual review (2013 data)

Data from 1999 to 2013

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Executive summary

In 2013, 295 tuberculosis (TB) cases were reported among Thames Valley residents, a rate of 14 per 100,000 population. Rates and numbers have stayed relatively stable over the past three years.

The highest numbers and rates of TB were reported among residents of Slough, Reading and Oxford local authorities. Although rates declined in Slough and Oxford from the previous year, Reading local authority had a 57% increase in TB cases compared to 2012.

Rates were highest among young adults, particularly males aged 20 to 39 years old. In 2013, 80% of individuals with TB in Thames Valley were born outside the UK: 30% of these entered the UK ten or more years earlier. TB numbers increased slightly in the non-UK born population compared to 2012, while the number of UK born patients fell slightly.

Although Pakistani was the most common ethnic group, TB rates were higher among those of Indian ethnicity. Numbers among the Indian population dropped compared to 2012 while cases among the Pakistani population stayed relatively stable since 1999. The number of patients of mixed/other ethnicity has increased, and the number of TB patients of black African ethnicity decreased since 2005. Numbers of white individuals have stayed fairly stable from 1999 to 2010, but then increased, although the proportion of these that were UK born has decreased (to 70% in 2013).

Little change was seen in numbers of patients of black Caribbean and Bangladeshi ethnic groups in Thames Valley: numbers continued to stay low in these groups. The most common country of birth of non-UK born TB patients was India followed by Pakistan.

Just over five per cent of patients were known to have one or more social risk factor in 2013 (homelessness, imprisonment and drug or alcohol misuse), and 19% of these had multiple risk factors. These were all males and almost all were born outside the UK (from a range of countries across the world). Just under a half of reported cases had pulmonary disease, of which 62% were sputum smear positive. As in recent years, a very small proportion of patients had a previous history of TB.

A high proportion of TB patients were offered an HIV test, and uptake of testing also remains extremely high in Thames Valley. The proportion of culture confirmed cases was 62%, which is above the national average of 59%,[1] increasing to 84% among those

with pulmonary disease. A very small number of patients had isoniazid resistant disease in 2013, and none were multi-drug resistant. These patients were almost all born abroad, and none had previously been treated for TB.

In Thames Valley, 84% of culture confirmed cases were strain typed with at least 23 loci completed since 2010. In total, there were 136 clustered cases resident in Thames Valley, a cluster rate of 23%. When considering strain typed cases that were part of national clusters, 52% of strain typed cases in Thames Valley clustered with at least one other case nationally. In total, there were 52 clusters in Thames Valley.

The majority of clusters consisted of two individuals and the largest cluster consisted of eight. The dominant strain in the region was the Central Asian lineage strain. The highest proportion of clustering was, however, in cases infected with the Beijing strain. A higher proportion of clustering was observed in children, the UK born, patients of white and Bangladeshi ethnicity, those with pulmonary TB, a previous TB diagnosis and social risk factors. These observations need to be interpreted with caution due to the relatively small number of cases.

According to the revised outcome categories, 88% of patients reported in 2012 with non-CNS, spinal, miliary or cryptic disseminated disease completed treatment within 12 months. Outcomes were high across Thames Valley, with the lowest levels of treatment completion in Buckinghamshire, where 83% of patients completed treatment.

The most common reasons for not completing treatment were death and being still on treatment. The median age of patients who died was over 70 years old, but the relationship between TB and death was not known for two-thirds of patients who died. Older patients and the non-UK born were more likely to die.

While rates were fairly low, unlike elsewhere across the country where a reduction in TB cases was seen in 2013, numbers and rates remained stable in Thames Valley. Also, six UK born children under the age of five were diagnosed with TB in 2013, an indication of recent transmission.

Recommendations for local NHS and PHE staff include auditing deaths to ensure opportunities for prevention are not missed (and relevant information completed on ETS), reviewing reasons for delays experienced by some patient groups, and the continued use of cohort review as the standard tool to ensure best case and contact management.

Background

TB continues to be a serious public health problem in the UK.

Surveillance provides relevant information on TB cases to local teams, to help plan and evaluate their services. This report is based on surveillance data on patients from TB clinics collected via the national Enhanced TB Surveillance (ETS) system and National Mycobacterium Reference Laboratory (NMRL). This dataset includes characteristics and distribution of TB cases, trends in anti-TB drug resistance, clustering of TB cases, and also patient outcomes.

Objectives

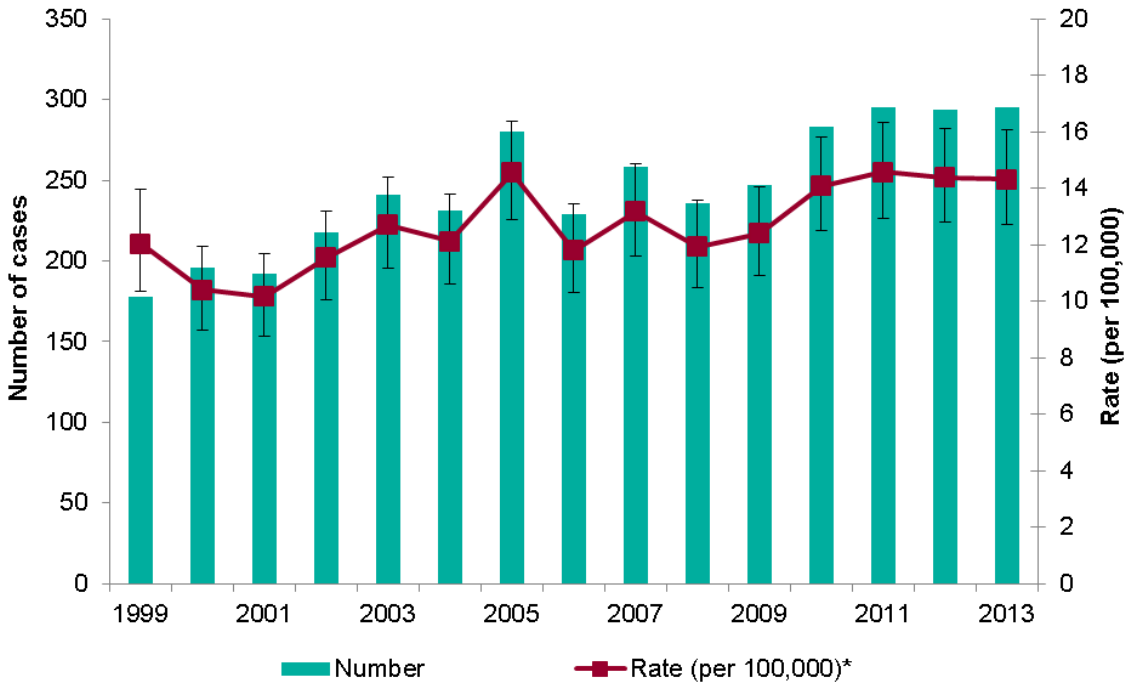
This report describes the recent epidemiology of TB in Thames Valley. We aim to inform public health, clinical and allied colleagues, including clinical commissioning groups, NHS England and local authorities of the latest trends, identify at-risk population groups, and identify opportunities for interventions and prevention of future cases among Thames Valley residents.

Tuberculosis epidemiology

Overall numbers, rates and geographical distribution

In 2013, 295 tuberculosis cases were reported among Thames Valley residents, a rate of 14 per 100,000 population. There has been little change in the number and rates in the past three years (Figure 1).

Figure 1: TB case reports and rates, Thames Valley, 1999 – 2013



*rate calculated using ONS mid-year population estimates

Figure 2 shows the trend in annual TB rates in Thames Valley by unitary or upper tier local authority. Since 1999, Slough and Reading have consistently had the highest TB rates. Rates in Reading have increased from 20 per 100,000 in 1999 to over 40 per 100,000 in 2013. Rates of TB in Slough have stayed stable over this period, at between 40 and 60 per 100,000.

Three-year average TB rates by unitary or lower tier local authority are shown in Figure 3. The highest rates and numbers were in Slough (three-year average from 2011 to 2013 of 58 per 100,000), followed by Reading (34 per 100,000) and Oxford (25 per 100,000) (Figure 3).

Figure 2: Annual TB case rates by upper tier local authority, Thames Valley, 1999 – 2013

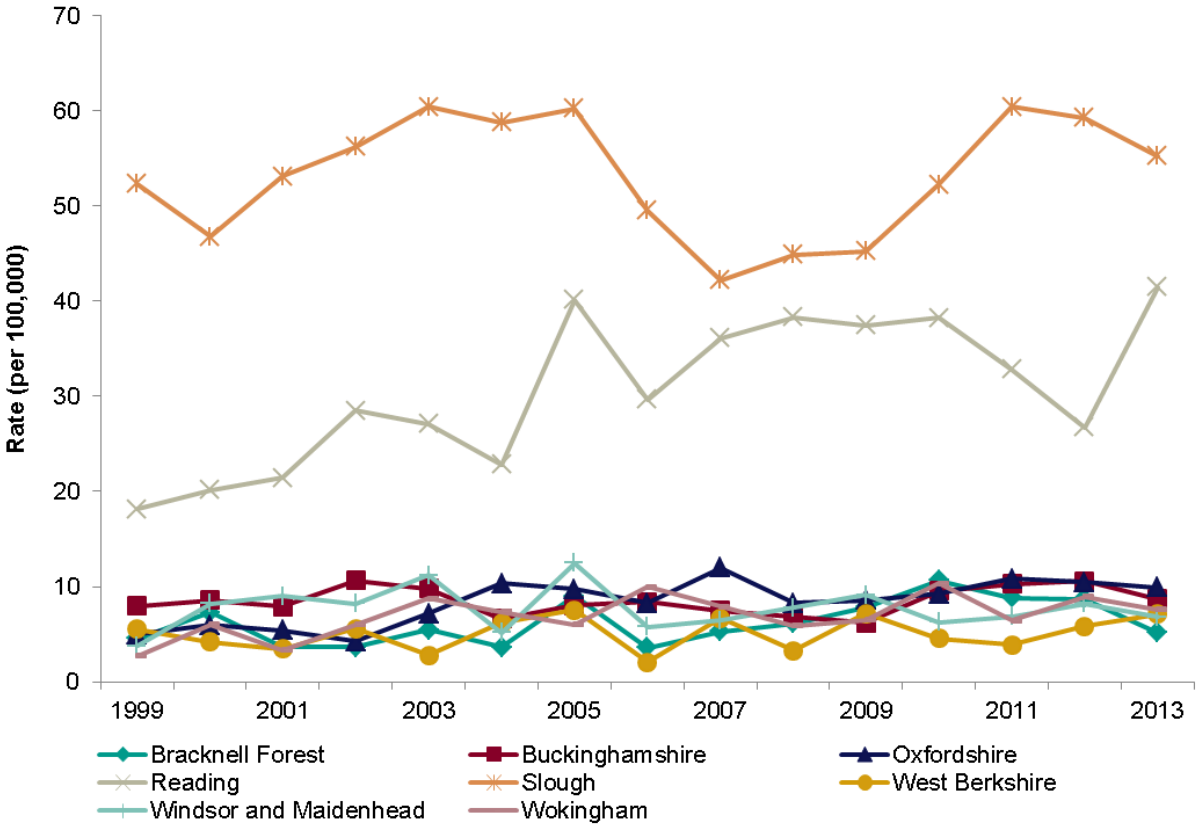
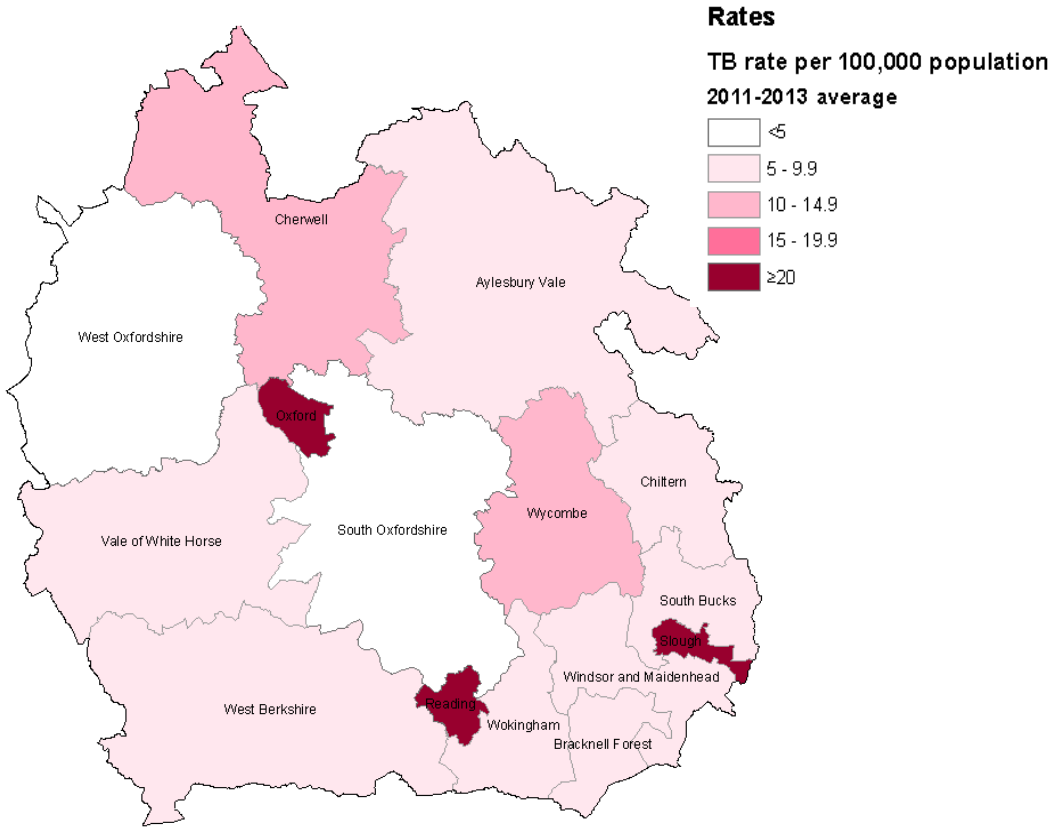


Figure 3: Three-year average TB case rates by local authority of residence, Thames Valley 2011 – 2013

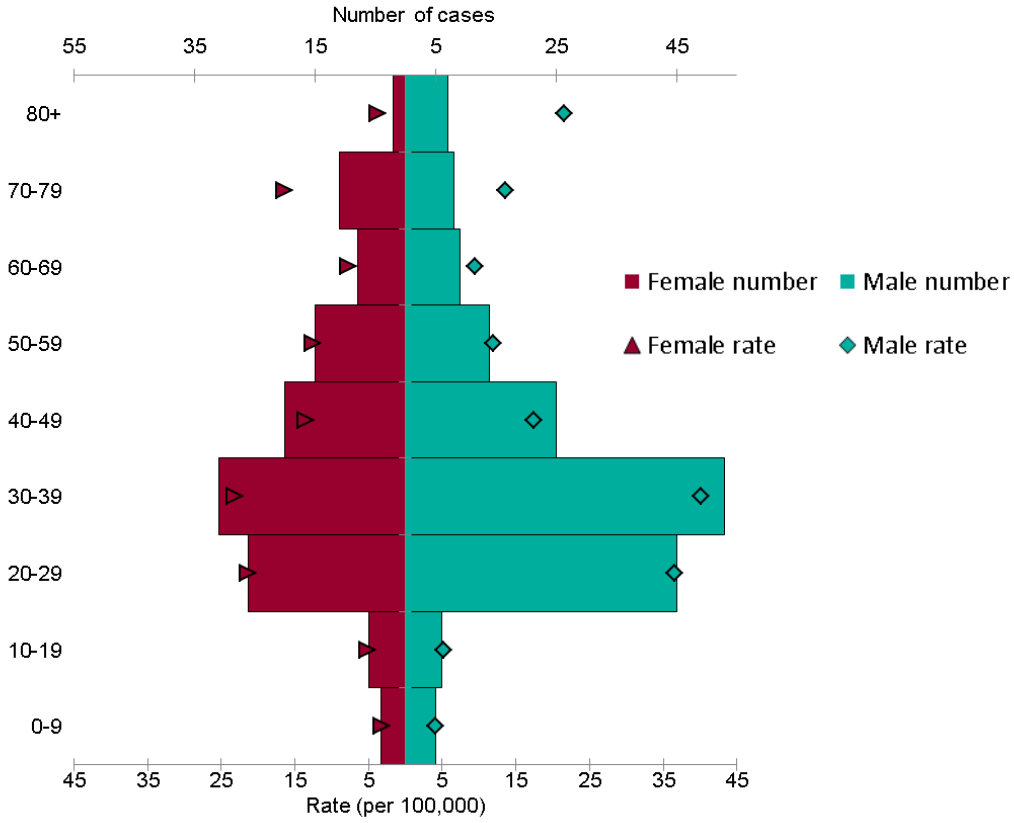


Demographic characteristics

Age and sex

In 2013, 58% of TB patients were male, and rates among males were slightly higher than females (18 per 100,000 vs. 13 per 100,000). Numbers and rates were highest among young adults aged 20 to 39 (Figures 4 and 5).

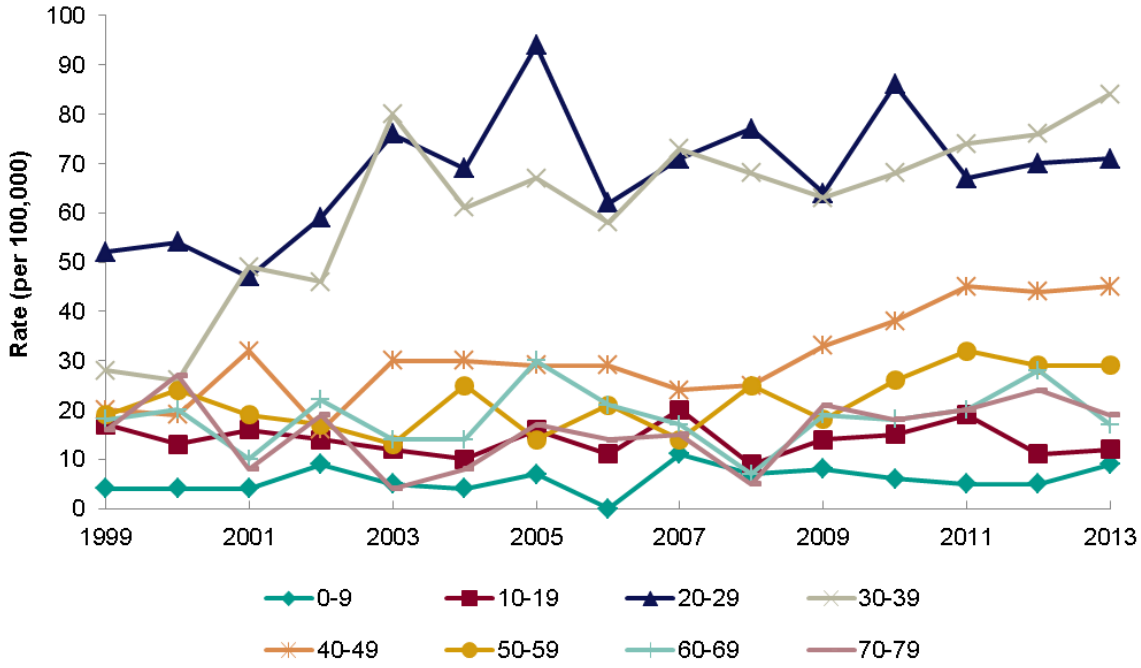
Figure 4: TB case numbers and rate by age and sex, Thames Valley, 2013



In 2013, 14 children aged less than 16 (a rate of 3.1 per 100,000) were diagnosed with TB. Eleven were UK born (79%) and three were born outside of the UK. The majority were of either white (28%) or black African ethnicity (28%).

This included six children aged less than five (a rate of 4.6 per 100,000). These children were all UK born and from a variety of ethnic groups. Five had been vaccinated with BCG, including one infant under the age of one who had TB meningitis.

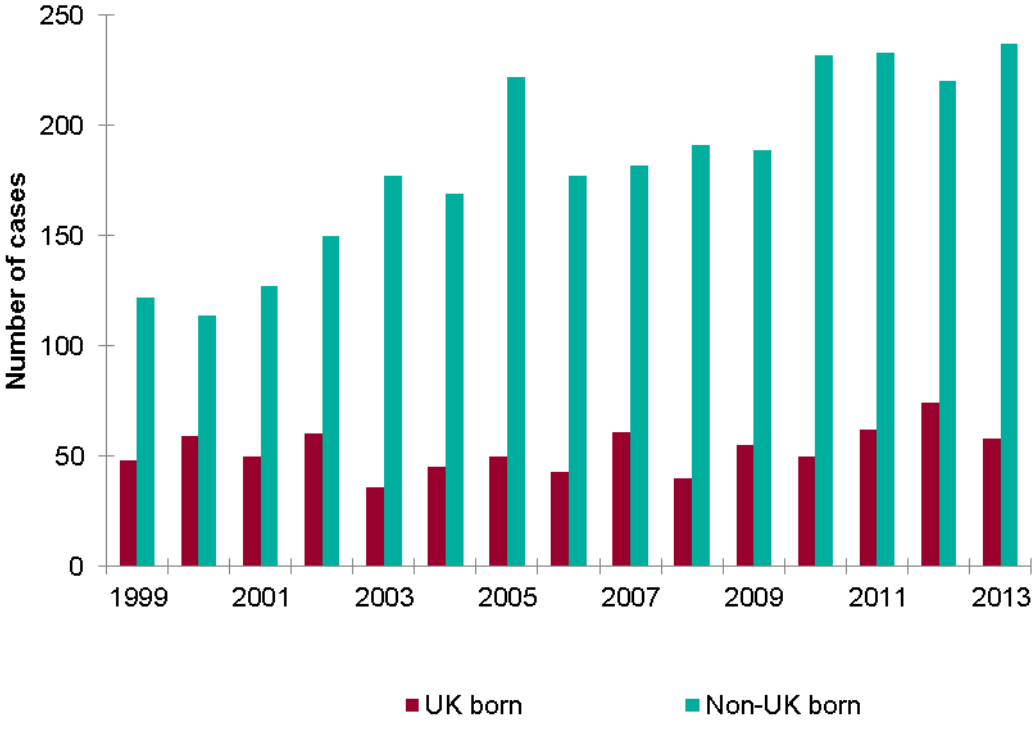
Figure 5: TB case rate by age group, Thames Valley, 1999 – 2013



Place of birth and time since entry

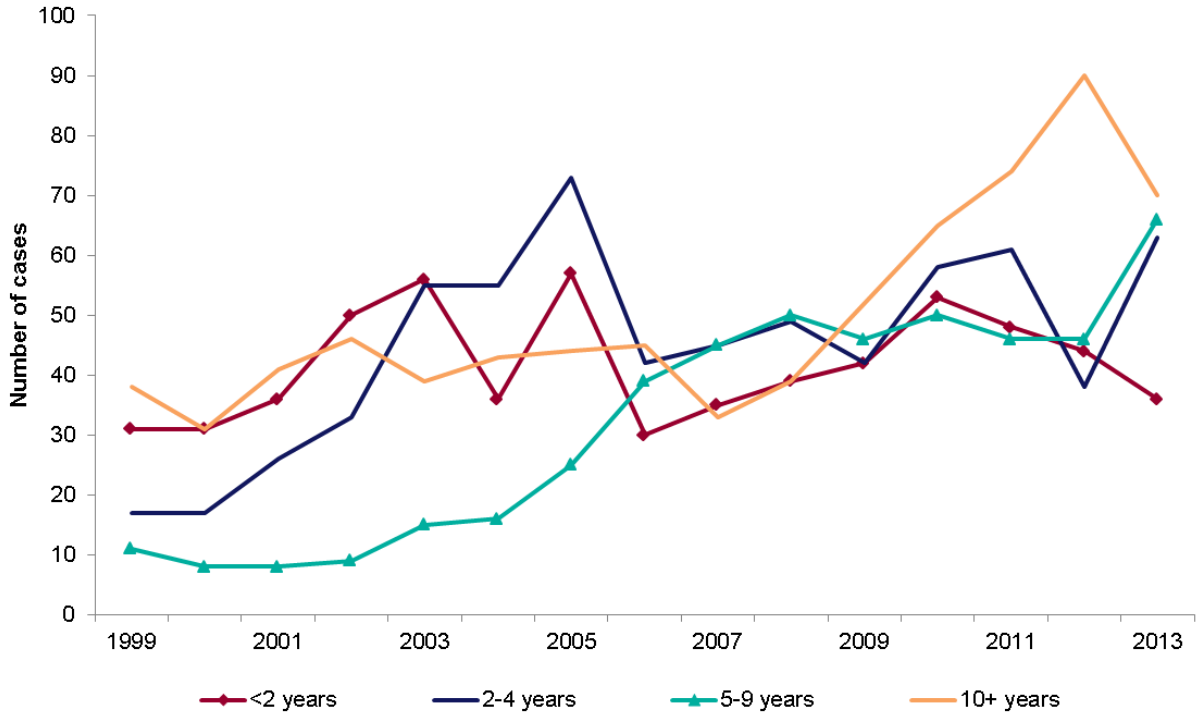
In 2013, 80% of TB patients were born outside of the UK, and the number of non-UK born remained three times as great as those born in the UK born. The numbers of TB cases among the non-UK born have increased steadily since 1999 (Figure 6).

Figure 6: TB case reports by place of birth, Thames Valley, 1999 – 2013



Among the UK born population, 58 cases of TB occurred in 2013, a slight decrease from 74 in the previous year. Among those born abroad, the largest proportion of TB patients (30%, 70/235) entered the UK more than 10 years before diagnosis, although this fell compared to 2012 (40%, 90/220) (Figure 7). This decrease was predominately in long-term migrants of Pakistani ethnicity, whose numbers fell from 35 (of 90) in 2012 to 19 (of 70) in 2013. There was also a slight decrease in numbers diagnosed in recent entrants (those who entered the UK within two years of diagnosis).

Figure 7: Non-UK born TB case numbers by time since entry, Thames Valley, 1999 – 2013



As in previous years, the most common country of birth of non-UK born TB patients was India, followed by Pakistan (Table 1). The next most common country of birth was Nepal.

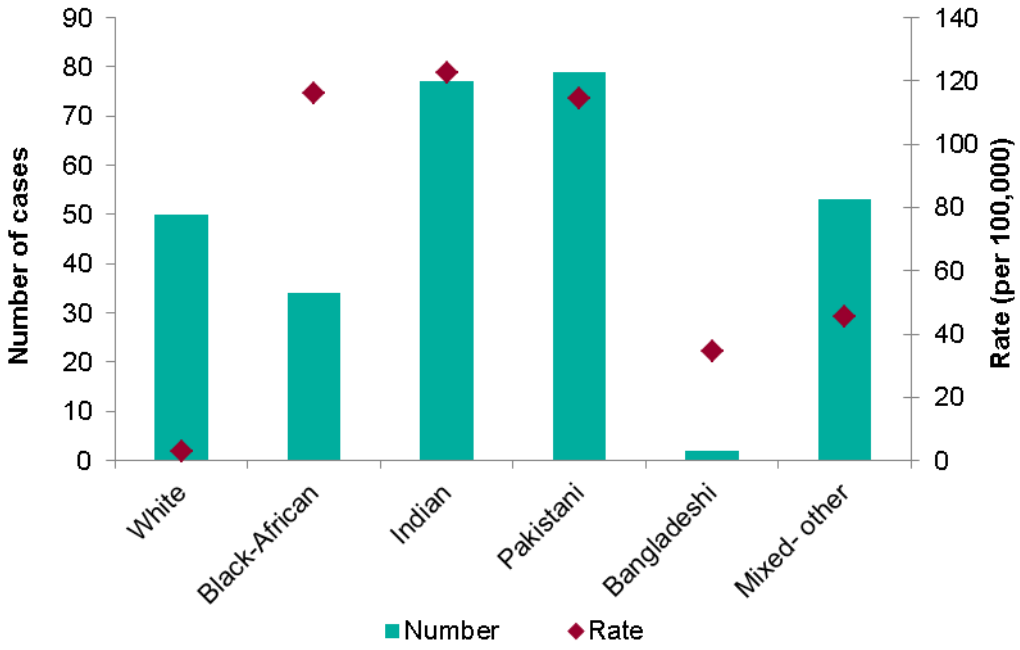
Table 1: Most common countries of birth of non-UK born TB patients, Thames Valley, 2012 – 2013

Country of birth	2012 n	2012 % of 220 non-UK born patients	2013 n	2013 % of 237 non-UK born patients
India	76	35	70	30
Pakistan	61	28	67	28
Nepal	12	5	15	6

Ethnicity

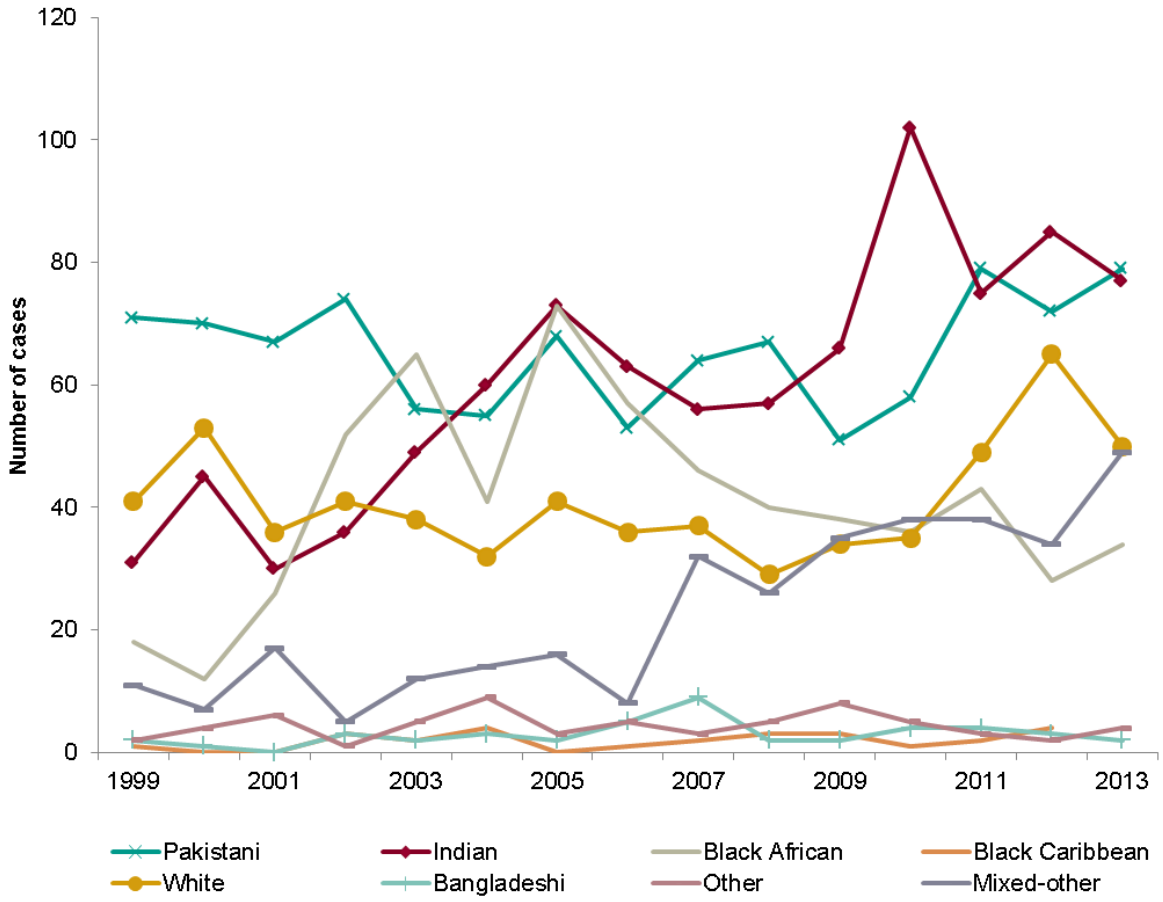
The most common ethnic group of TB patients in Thames Valley was Pakistani (accounting for over a quarter of all cases in 2013) at a rate of 115 per 100,000 population and Indian (accounting for a further quarter of cases, 77) at 123 per 100,000 population (Figure 8). The next most common ethnicity was white (70% of whom were UK born), although rates were low at 2.9 per 100,000 population, followed by mixed/other (most commonly born in Nepal (15/49, 31%)) at a rate of 59 per 100,000 population.

Figure 8: TB case reports and rates by ethnic group, Thames Valley, 2013



Numbers of Pakistani TB patients have stayed relatively stable since 1999, while numbers of Indian ethnicity have increased over this period (Figure 9). Numbers of white ethnicity were stable from 1999 to 2010, but have since increased, although the proportion of these that were UK born has decreased (to 70% in 2013). Numbers of patients of mixed/other ethnicity have increased since 1999. Black Africans accounted for 11% of TB patients in 2013 (mostly born in Somalia), and numbers from this ethnic group have decreased since 2005.

Figure 9: TB case reports by ethnicity and year, Thames Valley, 2013



Social risk factors

In 2013, 16 patients were reported as having one or more social risk factor (5.4%). Of those with risk factor information, 3.5% reported homelessness (10/286), 2% prison history (6/286) and 1% reported alcohol misuse (4/286). Just one patient reported drug misuse.

Patients with social risk factors were almost all non-UK born (15, 94%), and all were male. More than one in three were black African (from a range of countries) and a quarter were white (majority from Poland).

Clinical characteristics

Site of disease

Just under half (42%) of all patients reported in 2013 had pulmonary disease. The next most common site of disease was extra-thoracic lymph node TB, which accounted for over a quarter of cases (Table 2).

Pulmonary disease was more common among the UK born: 60% (35/58) vs. 37% (88/237) among the non-UK born in 2013. It was also more common among white patients (68%, 34/50) and less common among Pakistani (39%, 31/79) and Indian patients (26% 20/77).

Table 2: Site of disease of TB patients, Thames Valley, 2013

Site of disease	2013	
	n	%
Pulmonary	123	42
Lymph Node (extra thoracic)	88	30
IT Lymph Nodes	44	15
Pleural	37	13
Other	19	6
Gastrointestinal/Peritoneal	18	6
Bone/Joint (spine)	15	5
CNS (meningitis)	11	4
Miliary	7	2
Genitourinary	5	2
CNS (Other - not meningitis)	5	2
Bone/Joint (other - not spine)	5	2
Cryptic Disseminated	1	0
Laryngeal	1	0

*patients may have disease at more than one site, so the total % will not equal 100%

Previous diagnosis of TB

In 2013, 4% (13/295) of cases occurred in individuals with a previous history of TB.

BCG vaccination

Information on BCG vaccination was available for 80% of cases in 2013 (236), and 79% of these reported being vaccinated (Table 3). A higher proportion of non-UK born patients had been vaccinated (83%).

Of the UK born children aged less than five, 83% were vaccinated. The child that was not vaccinated was white. Among children aged less than 16, 80% of the UK born (8/10) and all three of the non-UK born children were vaccinated.

Table 3: Number and proportion of TB cases with BCG vaccination, Thames Valley 2013

	<5 years old			<16 years old			All ages		
	n	%	N	n	%	N	n	%	N
UK born	5	83	6	8	80	10	25	58	43
Non-UK born	-	-	0	3	100	3	161	83	193
All cases	5	83	6	11	84	13	186	79	236

Time symptomatic

The time between onset of symptoms and starting treatment was available for 93% of Thames Valley patients in 2013 (Table 4): the remaining patients were either asymptomatic at diagnosis, or did not have a date of symptom onset recorded. The median number of days was 104 with an interquartile range (IQR) of 55-192 days. This was lower among those with pulmonary disease at 68.5 days (IQR 34.5-135).

Table 4: Time between symptom onset and treatment start, Thames Valley 2013

	Median days (IQR)	0-2 months		2-4 months		>4 months		
		n	%	n	%	n	%	N
Extra-pulmonary	**130 (62-274)**	36	22	38	23	88	54	162
Pulmonary	**68.5 (34.5-135)**	44	39	34	30	34	30	112
Pulmonary smear positive	**70.5 (31-174.5)**	16	40	11	27	13	32	40
All cases	**104 (55-192)**	81	29	72	26	122	44	275

There was no difference between those born in the UK or abroad (median time to start treatment for those with pulmonary disease 68 vs. 69 days). The shortest treatment delays were for those of Pakistani ethnicity (49 days, IQR 30-120). Those of mixed/other ethnicity were predominantly born in Nepal and the median time to start treatment for those with pulmonary disease was 84.5 days (IQR 28.5 -181).

Males and females had similar delays to starting treatment (68.5 days, IQR 32-129 vs. 70.5 days, IQR 47-168 among females).

HIV testing

Information on HIV testing was available for 95% of patients (283/295), and 95% of these were offered an HIV test, or their HIV status was already known (268 patients). Uptake of testing was extremely high, and 91% of patients actually had an HIV test, or their status was already known (259).

Cohort review in the Thames Valley

288 cases were reviewed in 2013 in three Cohort Review meetings held in 2014. 1,111 contacts were identified (approximately 4 contacts per case) of which 923 contacts were assessed and 123 refused the assessment. 14 active and 68 latent TB infections were detected on contact tracing. 49 latent TB cases completed treatment at the time of the reviews. For one case in Oxfordshire, there were 117 contacts screened; of these 9 developed active TB and 32 contacts had latent TB infection. Overall management of such cases is in line with the national guidance and with high rates of completion of treatment but there are some areas where further improvement can be made:

- prompt sensitivity testing in suspected cases with multi-drug resistant TB (MDR)
- early referral by GPs and prison service to the TB team
- TB nurses should be informed promptly of any chest X-ray with suspected TB
- outcome of completion of chemoprophylaxis for latent TB infection to be noted
- appropriate resource provision for directly observed therapy (DOT)
- working with stakeholders to address the social and housing needs of hard-to-reach patients with TB

Microbiological information

Sputum smear and culture confirmation

Of the 123 pulmonary cases in 2013, 60% (75) had a sputum smear result. Of these, 62% (42) were sputum smear positive.

In 2013, 62% of all cases were confirmed by culture (181). This increased to 84% (103) among pulmonary cases vs. 46% among those with extra-pulmonary disease (78/181).

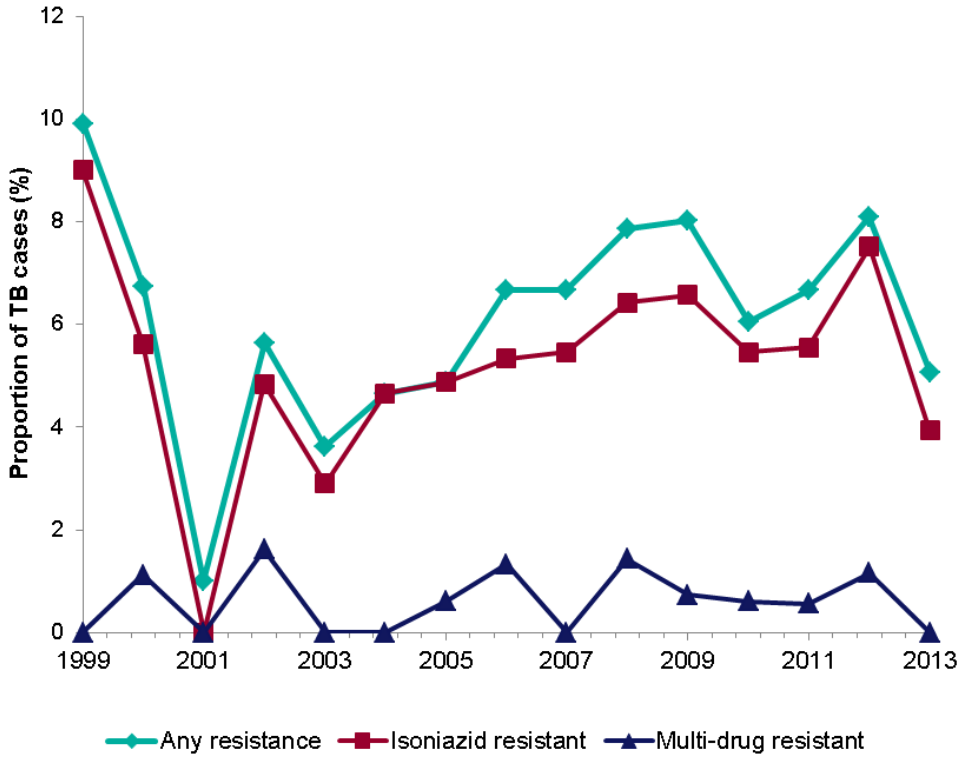
Drug resistance

Overall drug resistance and geographical distribution

The proportion of TB cases resistant to one or more first-line drug decreased to 5% (9/178) compared to 2012 (8%, 14/173), although numbers were very small and year-on-year changes should be interpreted with caution (Figure 10). This mostly reflected a decrease in isoniazid resistance (4%, 7). No patients with multi-drug resistant disease were diagnosed in 2013, decreasing from 7.5%, 13, in 2012.

Patients with drug resistance were mostly male (7/9), and almost all born abroad (8) in a range of countries. None had a previous history of TB.

Figure 10: Proportion of TB cases with first-line drug resistance, Thames Valley 1999 – 2012



TB clusters identified through molecular strain typing

The PHE National Strain Typing Service was established in January 2010. All TB isolates are typed using 24 loci mycobacterial interspersed repetitive unit-variable number tandem repeats (MIRU-VNTR) at the National Mycobacterium Reference Laboratory (NMRL). Cases with an identical strain pattern to that of at least one other individual are considered clustered.[2] All data shown are for patients reported between 2010 and 2013.

Proportion of cases clustered

Between 2010 and 2013, there were 704 culture confirmed cases in Thames Valley. Of these, 594 (84%) were successfully strain typed with at least 23 complete loci. In total, there were 136 clustered cases, a cluster proportion of 23% among those strain typed. These cases gave rise to 52 clusters comprising exclusively of individuals residing in Thames Valley. Considering in addition cases that were part of national clusters, there were 307 clustered cases in Thames Valley, giving a cluster rate of 52%.

Table 5: Clustering of TB cases in Thames Valley, 2010 – 2013

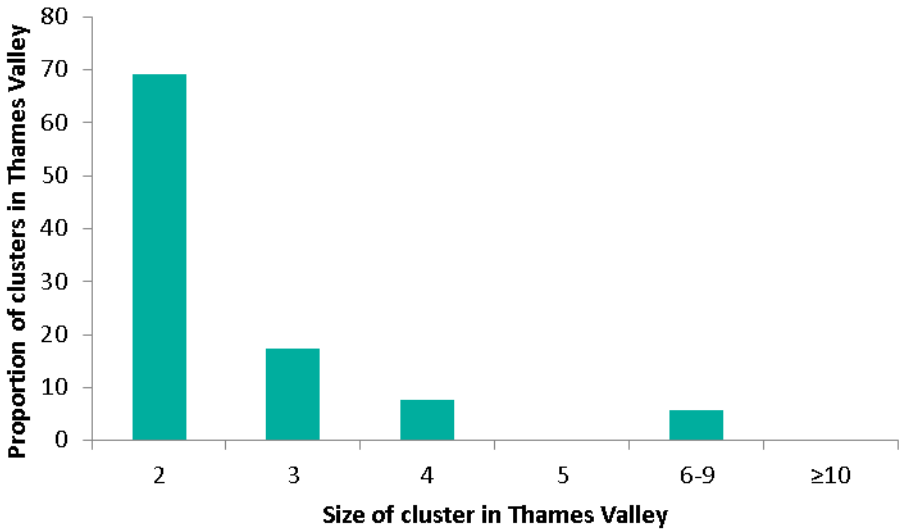
Year	Culture confirmed cases	Strain typed cases*		Cases clustered		Number of clusters
		n	% of culture confirmed	n	% of strain typed	
2010-2013	704	594	84%	136	23%	52

* Culture confirmed cases with a MIRU-VNTR profile with at least 23 complete loci

Size of clusters

Of the 52 clusters in Thames Valley, 69% consisted of two cases. A quarter of the clusters consisted of three or four cases. No cluster contained more than 10 cases. One cluster contained eight individuals from Thames Valley, and was part of a cluster consisting of 86 cases nationally. Another cluster consisted of seven cases in Thames Valley, and was part of a cluster of ten cases nationally (Figure 11).

Figure 11: Size of clusters in Thames Valley, 2010 – 2013



Cluster Lineage

Nearly half (46%) of the clustered cases in Thames Valley had a Central Asian lineage strain. Another 24% had a Euro American lineage strain, 16% Beijing and 8% East African. A higher proportion of cases infected with the Beijing strain were found to be in clusters: more than half (54%) compared to a third (33%) of cases infected with the Central Asian lineage (Table 6). Nearly one in five of those infected with the Euro American lineage were in clusters, and one in six of those infected with the East African Indian strain were clustered. The three largest clusters in Thames Valley were of the Central Asian and Beijing strain lineages.

Table 6: Lineage of reported TB clusters, Thames Valley 2010 – 2013

Lineage	Clustered cases		Number of cases
	N	%	n
Euro American	32	19	170
Central Asian	63	33	191
East African Indian	11	14	77
Beijing	22	54	41
Other*	8	12	66

***Including *M.bovis* cases, *M.africanum* cases, cases with multiple lineages and cases with no lineage known.

Characteristics of cases in clusters

A similar proportion of clustering was observed in male and female strain typed cases. Children comprised just 6% of all clustered cases, however, a higher proportion of clustering was observed in children compared to other age groups (Table 7).

More than two-thirds of clustered cases were non-UK born, yet among all non-UK born cases, only 20% were in clusters vs. 38% among all UK born cases. A higher proportion of clustering was observed in cases that entered the UK more than 10 years previously, compared to more recent entrants.

Bangladeshi cases had the highest proportion of clustering; however, this should be interpreted with caution due to the small numbers of cases in this group. The Indian ethnic group contributed the highest number of clustered cases, but less than a quarter were in clusters. The white ethnic group contributed the second highest number of clustered cases in Thames Valley, and 31% were in clusters (Table 7).

One in ten clustered cases had at least one social risk factor. Of all the patients with at least one social risk factor in Thames Valley, a third were in clusters.

More than two-thirds (69%) of clustered cases had pulmonary TB. Of these, 43% were sputum smear positive (but this was unknown for almost a third (31%) of them). Nearly three in ten pulmonary cases in Thames Valley were found to be in clusters. Only 7% of clustered cases had a previous diagnosis, but clustering was observed in 29% of patients with a previous diagnosis. Isoniazid resistance was observed in 3% of clustered cases, however, no clustered case had multi-drug resistant TB (Table 7).

Table 7: Characteristics of clustered cases, Thames Valley, 2010 – 2013

Characteristic		Number of clustered cases*		Total typed
		n	%	n
Sex	Male	80	22	359
	Female	56	24	235
Age	0-14 years	8	47	17
	15-44 years	88	22	396
	45 – 64 years	28	27	104
	>65 years	12	16	77
Country of birth	UK born	42	38	111
	Non-UK born	94	20	482
Non-UK born years since entry into the UK	<2 years	20	19	108
	2-10 years	41	17	238
	>10 years	32	24	132
Ethnic group	White	31	29	106
	Black African	12	17	72
	Black Caribbean	0	0	2
	Indian	35	23	153
	Pakistani	29	20	148
	Bangladeshi	3	38	8
	Mixed/Other	24	24	101
Social risk factor	One or more social risk factors	14	33	42
Clinical characteristics	Pulmonary disease	94	28	334
	Sputum smear positive**	40	28	144
	Previous TB diagnosis	10	29	34
	Isoniazid resistant	4	12	33
	Multi-drug resistant	0	0	2

*denominator varies slightly depending on variable completeness** of pulmonary cases

Treatment outcome

TB patient outcomes are reported in accordance with the revised 2013 World Health Organization (WHO) treatment outcome definitions.[3] Under these, outcome at 12 months is reported for the cohort of patients diagnosed in 2012 with drug (rifampicin) sensitive TB (excluding patients with initial or acquired rifampicin or multi-drug resistance) with expected course of treatment of less than 12 months (cohort 1A below), and separately for those with CNS, spinal, miliary or cryptic disseminated disease (cohort 1B below).

Outcome at 24 months is reported for the cohort (2) of patients diagnosed in 2011 with initial or acquired rifampicin or multi-drug resistance.

The national surveillance team also further revised the outcome data provided by clinics, and where the time between treatment start and end dates was greater than 365 days, any coded as completed within 12 months were reassigned to still on treatment at one year, and similarly for 24 and 36 month outcomes.[3] PHE will be working with clinic staff to improve and validate any amendments to outcome data.

1: Outcomes for patients with an expected course of treatment of less than 12 months

In 2012, 294 TB cases were notified, 291 (99%) of whom were not resistant to rifampicin and so included in cohort A with treatment outcome reported at 12 months. Of these, 26 had CNS, spinal, miliary or cryptic disseminated disease (presented in 1B) and the 265 without these types of disease are presented in 1A.

1A: Outcomes for patients with rifampicin sensitive TB: non CNS, spinal, miliary or cryptic disseminated disease

According to the revised outcome categories, 88% of the 265 patients with non-CNS, spinal, miliary or cryptic disseminated disease completed treatment within 12 months (Table 8).

Table 8: Number and proportion completing treatment at 12 months, Thames Valley, 2002 – 2012*

	n	%	Total*
2002	54	27	197
2003	177	79	225
2004	168	78	215
2005	207	79	263
2006	180	87	208
2007	200	82	245
2008	184	88	210
2009	200	88	227
2010	235	91	259
2011	222	86	259
2012	233	88	265

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

The most common reasons for not completing treatment for patients notified in 2012 were being still on treatment (4%) and death (4%) (Table 9). Information on the reason for being still on treatment was not available for almost half of these (recoded to still on treatment by the national surveillance team), however, four were recorded as having treatment initially planned to be more than 12 months and one was recorded as having their treatment interrupted.

Table 9: TB outcome at 12 months, Thames Valley, 2012*

Outcome at 12 months	n	%
Completed	233	88
Died	11	4
Lost to follow up	6	2
Still on treatment	11	4
Treatment stopped	3	1
Transferred out	0	0
Not evaluated	1	0
Total	265	

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

Where the reason was death, TB caused or contributed to three deaths and was incidental in one death: however, the relationship was unknown for seven patients. The median age at death was 74 (range 52 to 92) and three were diagnosed at post-mortem (relationship to death not known). Older patients aged over 70 had worse outcomes (31% died before completing treatment, 9/29) and there was a higher proportion of deaths in males (4.9% 8/163 vs. 2.3% 3/128 in females). UK born patients had worse outcomes (79% completed, 53/67 vs. 91%, 180/198 of non-UK born patients), and were more likely to die (7.4%, 6 vs. 3%, 5).

Outcomes also varied across Thames Valley, with the lowest levels of treatment completion in Buckinghamshire and Oxfordshire (Table 10).

Table 10: TB outcome at 12 months by upper tier local authority, Thames Valley, 2012*

	Completing treatment		Died		Lost to follow up		Still on treatment		Treatment stopped		Not evaluated		Total
	n	%	n	%	n	%	n	%	n	%	n	%	
Bracknell Forest	8	100	0	0	0	0	0	0	0	0	0	0	8
Buckinghamshire	43	83	4	8	1	2	2	4	2	4	0	0	52
Oxfordshire	54	86	3	5	4	6	2	3	0	0	0	0	63
Reading	36	92	0	0	0	0	1	3	1	3	1	3	39
Slough	63	88	3	4	1	1	5	7	0	0	0	0	72
West Berkshire	9	100	0	0	0	0	0	0	0	0	0	0	9
Windsor and Maidenhead	9	90	1	10	0	0	0	0	0	0	0	0	10
Wokingham	11	92	0	0	0	0	1	8	0	0	0	0	12
Thames Valley	233	88	11	4	6	2	11	4	3	1	1	0	265

*excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

1B: Outcomes for patients with rifampicin sensitive TB with CNS, spinal, miliary or cryptic disseminated disease

A high proportion of patients with CNS disease completed treatment within 12 months (84% 22/26) (Table 11). Three patients were still on treatment (recoded by the national surveillance team so additional information on reason was missing).

Table 11: TB outcome at 12 months for patients with CNS, spinal, miliary or cryptic disseminated disease, Thames Valley, 2012*

Outcome at 12 months	n	%
Completed	22	85
Died	1	4
Lost to follow up	0	0
Still on treatment	3	12
Treatment stopped	0	0
Transferred out	0	0
Not evaluated	0	0
Total	26	

*excludes rifampicin resistant TB

2: TB outcome at 24 months for patients with rifampicin resistant disease

In 2011, only one TB patient was initially rifampicin resistant at start of treatment and multi-drug resistant, and none extensively-drug resistant (XDR). At 12 months, the patient was lost to follow up (left the UK) and no further information was available.

Difference between original and revised 12 month outcomes:

Outcomes for patients reported between 2002 and 2012 were revised, and a number originally reported as completing within 12 months were reassigned to another category, particularly to still on treatment if treatment start and end dates suggested patients were treated for longer than 365 days (or 730 for 24 month outcomes). Further work is required to determine if this interpretation is correct, and PHE will be working with clinics to establish this.

Of the 265 patients with non CNS, spinal, miliary or cryptic disseminated disease, 90% (239) were reported as completed treatment within 12 months by the clinics, but after revisions based on treatment dates this was reduced to 88% (233). This was due to outcomes being recoded to ‘still on treatment at 12 months’, which increased to 4% (11) of patients from the original clinic data of just 2% (5).

Among patients with CNS, spinal, miliary or cryptic disseminated disease, again a number of patients who were reported to have completed treatment within 12 months were recoded to still in treatment (three out of 26).

Discussion

Rate of TB in Thames Valley in 2013 was slightly above the national average of 12.3 cases per 100,000 population. After increasing steadily over the past decade, the number and rate of TB has stabilised in the past three years and a small decrease was seen among the UK born population. Elsewhere in the UK, however, a decrease in TB case number was observed in 2013 compared to 2012.[1]

Highest rates were seen among young adults, but six cases of TB were diagnosed in UK born children aged under five during 2013.

Most patients were born abroad and rates were highest among the Indian and Pakistani populations. Since 1999, numbers of TB cases have increased among those of Pakistani and mixed/other ethnicity (most frequently from Nepal in recent years). Since 2010, the number of white TB patients also increased, with an increasing proportion born outside the UK.

HIV testing offer and uptake were excellent where reported (and only missing for 5% of patients). Information on symptom onset of patients was well completed, and identified those of mixed/other ethnicity (most commonly from Nepal) had longer delays to treatment. Delay leads to worse outcomes for the patient and increased risk of transmission to others, and should be investigated further to identify any barriers to the early identification of cases.

Nearly a quarter of cases that were strain typed were found to cluster with at least one other case in Thames Valley. If considering cases that cluster with at least one other case nationally, more than half of the strain typed cases in Thames Valley were in clusters. The majority of clusters consisted of two people and the largest cluster consisted of eight cases.

The predominant strain in Thames Valley was the Central Asian lineage strain. Similar to other regions, a higher proportion of cases infected with the Beijing lineage strain were found to be in clusters than any other strain lineage.

A higher proportion of clustering was observed in children, the UK born, those of white or Bangladeshi ethnicity, and those with at least one social risk factor. These observations should be interpreted with caution due to the relatively small number of cases in Thames Valley.

Treatment completion at 12 months among patients with rifampicin sensitive and non-CNS, spinal, miliary or cryptic disseminated disease was slightly above average for the UK.[1] The most commonly reported reasons for not completing were still being on treatment and death. For the majority of deaths, the relationship between TB and death was unknown. These deaths, as well as those where TB was a cause or contributing factor, should be reviewed to ensure that opportunities for prevention were not missed.

While rates remain low in Thames Valley, no decrease in TB cases has been observed in contrast to the rest of the country. Cases also continue to occur in young UK born children, an indication of recent transmission in the UK.

Conclusion and recommendations

This report updates the latest epidemiology of TB in Thames Valley, describing those populations at increased risk of disease. This evidence can help services implement the basic elements of TB control, namely prompt identification of active cases of disease, supporting patients to successfully complete treatment, and preventing new cases of disease occurring. The information will also be useful to target resources effectively.

Key recommendations for the NHS and PHE derived from the data presented in this report include:

1. Continue excellent case management including universal HIV testing[3], and following NICE guidance[5] and the national Royal College of Nursing guidance on TB case management as best practice.[6]

2. Audit deaths among TB patients to ensure opportunities to understand the reason for deaths and prevent subsequent deaths are not missed.

3. Review patient groups that experience long delays to diagnosis, to assess any barriers to earlier identification.

4. Continue to use cohort review as the standard tool to routinely review appropriate case and contact management and consider opportunities for prevention or earlier identification of all cases.

In January 2015, PHE and NHS England published the Collaborative TB Strategy for England 2015 to 2020, which sets out the improvements that need to be achieved across ten key areas to bring about a sustained decline in TB in England.

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Appendix A: Description of data sources and definitions

Data sources
Data on tuberculosis cases in London comes from the PHE London TB Register (LTBR). These data contribute to the national Enhanced TB surveillance (ETS) system. Data collected include notification details, and demographic, clinical and microbiological information.

Information on treatment outcomes are reported for all cases reported in the previous year, excluding those with known rifampicin resistant disease: treatment outcomes for these cases are reported at 24 months. Definitions for treatment outcome are based on World Health Organization (WHO) and European definitions, but adapted to the UK context. In this report, all data were obtained from the ETS matched dataset provided in August 2013.

Estimates of HIV co-infection rates were provided by the TB Section at PHE's Centre for Infectious Disease Surveillance and Control. TB case reports in ETS aged 15 years and older were matched to HIV case reports (SOPHID and new diagnoses).

Proportions
All proportions in this report are calculated among cases with known information or a known result, except where otherwise stated.

Confidence intervals
A 95% confidence interval for incidence was obtained using the relevant procedure in Stata, assuming a Poisson distribution. For prevalence data (proportions) a binomial distribution was assumed.

Cluster definitions

Strain typing was performed at the TB reference laboratories using 24 MIRU-VNTR profiling. Analysis was undertaken on strain type clusters defined as two or more people with TB caused by indistinguishable 24 loci strains, with at least one case which has a complete 24 VNTR, additional cases of the cluster may each have one missing locus. Analysis of clustering in London was carried out on cases that clustered in London and notified in 2010, 2011 or 2012. Recent transmission was defined using the calculation (no. of isolates in clusters-no. of clusters) / total no isolates with a strain type.

Appendix B: TB among Thames Valley residents

Table Bi: Number of TB by local authority of residence, Thames Valley 1999 – 2013

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Aylesbury Vale	4	16	8	6	14	5	11	9	11	12	13	18	8	18	16
Bracknell Forest	5	8	4	4	6	4	10	4	6	7	9	12	10	10	6
Cherwell	4	7	2	1	3	10	7	12	25	12	7	14	15	15	17
Chiltern	3	5	4	2	4	4	5	4	1	4	2	3	6	7	4
Oxford	16	23	17	17	35	43	39	27	41	29	35	30	43	39	34
Reading	26	29	31	41	39	33	59	44	54	58	57	59	51	42	66
Slough	62	56	64	68	73	71	74	62	54	59	61	72	85	84	79
South Bucks	3	2	2	5	6	3	4	6	5	1	4	4	8	8	4
South Oxfordshire	6	2	8	4	2	3	5	4	4	4	7	4	4	4	4
Vale of White Horse	4	4	4	2	1	7	7	7	4	5	5	8	6	8	5
West Berkshire	8	6	5	8	4	9	11	3	10	5	11	7	6	9	11
West Oxfordshire	0	0	2	2	3	1	3	2	2	3	1	4	3	3	6
Windsor and Maidenhead	5	11	12	11	15	7	17	8	9	11	13	9	10	12	10
Wokingham	4	9	5	9	13	11	9	15	12	9	10	16	10	14	12
Wycombe	28	18	24	38	23	20	19	22	20	17	12	23	30	21	21
Thames Valley	**178**	**196**	**192**	**218**	**241**	**231**	**280**	**229**	**258**	**236**	**247**	**283**	**295**	**294**	**295**

Table Bii: Rate of TB by local authority of residence, Thames Valley 1999 – 2013

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	20
Aylesbury Vale	2.5	9.8	4.8	3.6	8.4	3.0	6.5	5.3	6.4	7.0	7.5	10.3	4.5	1
Bracknell Forest	9.1	7.3	3.7	3.7	5.5	3.7	9.1	3.6	5.4	6.3	8.0	10.6	8.7	
Cherwell	3.1	5.3	1.5	0.7	2.2	7.4	5.1	8.7	17.9	8.6	5.0	9.8	10.5	1
Chiltern	3.3	5.6	4.5	2.2	4.4	4.4	5.5	4.3	1.1	4.3	2.2	3.2	6.5	
Oxford	11.7	16.8	12.4	12.2	24.7	29.6	27.0	18.7	28.4	19.9	23.7	20.0	28.2	2
Reading	35.8	20.2	21.5	28.5	27.0	22.5	39.8	29.4	35.7	38.1	36.9	38.0	32.5	2
Slough	103.9	46.8	52.9	56.3	60.4	57.8	59.1	48.4	41.1	43.8	44.3	51.2	59.9	5
South Bucks	4.9	3.2	3.2	8.1	9.6	4.7	6.2	9.2	7.6	1.5	6.0	6.0	11.9	1
South Oxfordshire	4.7	1.6	6.2	3.1	1.5	2.3	3.8	3.0	3.0	3.0	5.2	3.0	3.0	
Vale of White Horse	3.5	3.5	3.5	1.7	0.9	6.0	5.9	5.9	3.4	4.2	4.1	6.6	4.9	
West Berkshire	11.2	4.2	3.5	5.5	2.8	6.1	7.4	2.0	6.6	3.3	7.1	4.5	3.9	
West Oxfordshire	0.0	0.0	2.1	2.1	3.1	1.0	3.0	2.0	1.9	2.9	1.0	3.8	2.8	
Windsor and Maidenhead	7.7	8.2	9.0	8.2	11.1	5.1	12.3	5.7	6.4	7.7	9.0	6.2	6.9	
Wokingham	5.4	6.0	3.3	6.0	8.7	7.4	6.0	9.9	7.8	5.8	6.5	10.3	6.4	
Wycombe	17.3	11.1	14.8	23.3	14.1	12.1	11.5	13.2	11.9	10.1	7.0	13.4	17.3	1
Thame Valley	**12.0**	**10.4**	**10.2**	**11.5**	**12.7**	**12.1**	**14.5**	**11.8**	**13.2**	**11.9**	**12.4**	**14.1**	**14.6**	**1**

*rates calculated using ONS mid-year population estimates

Table Biii: Number and proportion of UK born TB patients by upper tier local authority of residence, Thames Valley, 2013

	UK born		Total
	n	%	
Bracknell Forest	3	50	6
Buckinghamshire	10	22	45
Oxfordshire	19	29	66
Reading	7	11	66
Slough	9	11	79
West Berkshire	3	27	11
Windsor and Maidenhead	3	30	10
Wokingham	4	33	12
Thames Valley	58	20	295

Table Biv: Number and proportion of TB patients by ethnic group and upper tier local authority of residence, Thames Valley, 2013

	White		Black African		Indian		Pakistani		Bangladeshi		Mixed/Other		Other		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Bracknell Forest	2	33	0	0	2	33	0	0	0	0	2	33	0	0	6
Buckinghamshire	12	27	6	13	5	11	21	47	0	0	1	2	0	0	45
Oxfordshire	17	26	11	17	10	15	10	15	2	3	15	23	1	2	66
Reading	7	11	7	11	10	15	19	29	0	0	21	32	2	3	66
Slough	5	6	9	11	32	41	25	32	0	0	7	9	1	1	79
West Berkshire	3	27	0	0	5	45	1	9	0	0	2	18	0	0	11
Windsor and Maidenhead	2	20	0	0	6	60	1	10	0	0	1	10	0	0	10
Wokingham	2	17	1	8	7	58	2	17	0	0	0	0	0	0	12
Thames Valley	50	17	34	12	77	26	79	27	2	1	49	17	4	1	295

Table Bv: Social risk factors among TB patients by upper tier local authority of residence, Thames Valley, 2013

	Any social risk factor		Where reported	Total patients
	n	% of where reported		
Bracknell Forest	0	7	6	6
Buckinghamshire	5	10	43	45
Oxfordshire	6	14	63	66
Reading	3	0	65	66
Slough	1	6	74	79
West Berkshire	1	13	11	11
Windsor and Maidenh..	0	15	9	10
Wokingham	0	0	12	12
Thames Valley	16	6	283	295

Table Bvi: Offer and uptake of HIV test among TB patients by upper tier local authority of residence, Thames Valley, 2013

	HIV status known		Not offered		Offered and:						Missing		Total
					Done		Not done		Refused				
	n	%	n	%	n	%	n	%	n	%	n	%	
Bracknell Forest	0	0	1	17	5	83	0	0	0	0	0	0	6
Buckinghamshire	1	2	2	4	33	73	3	7	4	9	2	4	45
Oxfordshire	1	2	4	6	61	92	0	0	0	0	0	0	66
Reading	3	5	4	6	57	86	0	0	0	0	2	3	66
Slough	2	3	3	4	67	85	1	1	0	0	6	8	79
West Berkshire	0	0	0	0	10	91	1	9	0	0	0	0	11
Windsor and Maidenh..	0	0	1	10	8	80	0	0	0	0	1	10	10
Wokingham	0	0	0	0	11	92	0	0	0	0	1	8	12
Thames Valley	7	2	15	5	252	85	5	2	4	1	12	4	295

Appendix C: All TB patients notified by Thames Valley hospitals

Table Ci: Treatment Outcome at 12 months for all notifications with rifampicin sensitive TB reported by Thames Valley hospitals, 2012 (outcome collected 12 months later during 2013)

	2012 Total Notifs	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not Evaluated
Churchill Hospital	60	87%	3%	5%	3%	2%	0%
Horton General Hospital	3	67%	0%	0%	33%	0%	0%
John Radcliffe Hospital	4	100%	0%	0%	0%	0%	0%
King Edward VII Hospital [Windsor]	89	90%	4%	4%	1%	0%	0%
Thames Valley	156	88%	4%	4%	3%	1%	0%

excludes rifampicin resistant TB, and patients with CNS, spinal, miliary or cryptic disseminated disease

Table Cii: HIV testing (offered and uptake) among all TB notifications reported by Thames Valley hospitals, 2013

	2013 Total Notifs	Offered And Done	Offered But Refused	Offered But Not Done	HIV Status Already Known	Not Offered	Null	Test offered (or status known)	Test done (or status known)
Churchill Hospital	62	59	1	0	1	1	0	98%	97%
Horton General Hospital	7	7	0	0	0	0	0	100%	100%
John Radcliffe Hospital	7	2	0	0	0	5	0	29%	29%
King Edward VII Hospital [Windsor]	40	38	0	0	0	1	1	95%	95%
Wexham Park Hospital	45	36	0	0	2	2	5	84%	84%
Private Clinics	1	0	0	0	0	1	0	0%	0%
Thames Valley	162	142	1	0	3	10	6	90%	90%

Table Ciii: Drug resistance amongst <u>all</u> TB notifications reported by Thames Valley hospitals, 2013

	Any drug resistance*		Isoniazid resistant		Multi-drug resistant		Total**
	n	%	n	%	n	%	
Churchill Hospital	4	9%	3	7%	0	-	45
Horton General Hospital	0	-	0	-	0	-	6
John Radcliffe Hospital	0	-	0	-	0	-	1
King Edward VII Hospital [Windsor]	1	3%	0	-	0	-	30
Wexham Park Hospital	2	8%	2	8%	0	-	24
Private Clinics	-	-	-	-	-	-	0
Thames Valley	7	7%	5	5%	0	-	106

Table Civ: Treatment Outcome at 12 months for all notifications with rifampicin sensitive, CNS, spinal, miliary or cryptic disseminated disease reported by Thames Valley hospitals, 2012 (outcome collected 12 months later during 2013)

	2012 Total Notifs	Treatment completed	Still on treatment	Died	Lost to follow up	Treatment stopped	Not Evaluated
Churchill Hospital	7	71%	14%	14%	0%	0%	0%
Horton General Hospital	0	-	-	-	-	-	-
John Radcliffe Hospital	2	0%	50%	50%	0%	0%	0%
King Edward VII Hospital [Windsor]	12	75%	17%	8%	0%	0%	0%
Thames Valley	21	67%	19%	14%	0%	0%	0%

Table Cv: HIV testing (offered and uptake) among all TB notifications reported by Thames Valley hospitals, 2013

	Culture positive (all)		Total notifs	Culture positive (pulmonary)		Pulmonary with smear result		Total Pulmonary
	n	%	N	n	%	n	%	
Churchill Hospital	45	73%	62	16	64%	23	92%	25
Horton General Hospital	6	86%	7	3	75%	3	75%	4
John Radcliffe Hospital	2	29%	7	0	-	2	50%	4
King Edward VII Hospital [Windsor]	30	75%	40	11	79%	13	93%	14
Wexham Park Hospital	25	56%	45	10	63%	9	56%	16
Private Clinics	0	-	1	-	-	-	-	0
Thames Valley	108	67%	162	40	63%	50	79%	63